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(54) **Fabric softening composition**

(57) A storage stable fabric-softening composition comprises a water-insoluble cationic detergent having two C_{12}-C_{22} alkyl or alkenyl groups and a free C_8-C_{24} alkyl- or alkenylmonocarboxylic acid or polymer thereof. Further inclusion of a water-soluble cationic detergent surfactant or cationic polymer significantly increases the softening performance and resistance to residual anionics.

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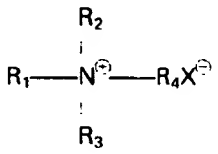
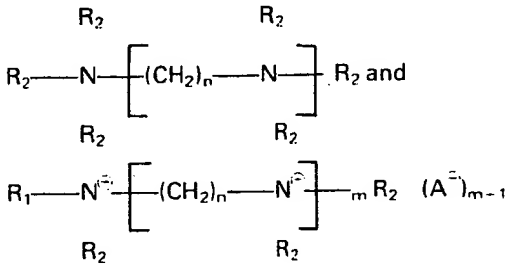
Typical examples of relatively water-soluble cationic detergent surfactants are those having only one long-chain alkyl group, such as



wherein R_1 = C_{10}-C_{24}, preferably C_{16}-C_{18} alkyl or alkenyl group
R_2, R_3 and R_4 are each C_1-C_4, preferably methyl groups and X is a halide or methosulphate.

Other such single long-chain cationic detergent surfactants are cetylbenzyl dimethyl ammoniumchloride, myristoyloxyethyl trimethyl ammoniumiodide, stearoyloxyethyl trimethyl ammoniumchloride, tallow fatty acylcholinechloride, eicosyloxycarbonylmethyl trimethyl ammoniumchloride, stearoylaminoethyl triethyl ammoniumchloride, behenoylaminopropyl trimethyl ammoniumchloride, cetylsulphonylaminoethyl trimethyl ammoniummethosulphate, stearyloxyethylene oxyethyl tripropyl ammoniumchloride, cetylpyridiniumchloride, 3-cetyloxy-2-hydroxypropyl trimethyl ammoniumchloride and 3-behenoyloxy-2-hydroxypropyl trimethyl ammoniumchloride. Di(coco)dimethyl ammoniumchloride, being relatively water-soluble, is also embraced by the above definition of suitable relatively water-soluble cationic detergent surfactants.

Other suitable relatively water-soluble cationic detergent surfactants are



wherein R_1 = C_{10}-C_{24}, preferably C_{16}-C_{18} alkyl or alkenyl group
R_2 = H or $(C_2H_4O)_nH$ or $(C_3H_6O)_nH$ or C_1-C_3 alkyl
in which p and q are O or a number such that p+q is at most 25,
n = a whole number from 2-6, preferably 3,
m = a whole number from 1-9, preferably 1-4,
A^- = an anion, preferably a halide or acetate.

Mixtures of the above cationic detergent surfactants may also be used.

Instead of the above, relatively water-soluble cationic detergent surfactants, or in addition thereto, cationic polymers can be used, such as cationic polysaccharide gums, cationic starches or starch derivatives, cationic polyvinyl alcohol or polyvinylpyrrolidone, quaternized dextrans, quaternized hydroxyethylcellulose, cationic guar gum, copolymers of dialkylamino alkylmethacrylate etc. Suitable preferred examples are cationic guar gum, dextran (M.W. 500,000) substituted with diethylaminoethylgroups to give 3.2% N in the molecule, and hydroxyethylcelluose (M.W. 400,000), quaternized with 2,3-epoxypropyltrimethyl ammoniumchloride or 3-chloro-2-hydroxypropyltrimethyl ammoniumchloride.

The compositions of the invention may furthermore comprise the normal adjuvants, usually present in such compositions. Examples thereof are inorganic salts in minor amounts, such as sodium chloride, solvents such as ethyl- or isopropylalcohol or hexyleneglycol (up to 15%), nonionic surfactants such as condensates of ethylene oxide and or propylene oxide with fatty alcohols or fatty acids, esters of fatty acids with polyols e.g. clycerolmonostearate, ethoxylated sorbitan esters, in minor amounts (up to 5%), furthermore emulsifiers, perfumes, colourants, germicides, hydrotropes and so on. Clays, such as smectite-type clays, should not be included in any significant amount, as this may cause unstable products. The pH of the composition is 5 or below, or adjusted thereto.

The compositions of the invention may be made in any suitable manner. Preferably, however, the two or three essential ingredients are premixed, heated together until clear and then the molten mixture is added to water with stirring.

The invention will further be illustrated by the following Examples.

Test 1

Compositions 1-4 and a commercial rinse conditioner based solely on di(harden d tallow) dimethyl ammoniumchloride were dispersed in demineralised water to give dilute aqueous dispersions containing 0.01% of the active ingredients in each case. Three pieces of clean cotton towelling (40 g) were rinsed in a Tergotometer pot with 800 ml of the aqueous dispersion at ambient temperatures for 10 minutes, followed by spin-drying and drying in a hot air cabinet.

This rinsing process using the five compositions was carried out in a series of Tergotometer pots, with each of the compositions used 4 times according to a balanced statistical design.

The resulting cloth pieces were assessed for relative softness in ranking order by a panel of 5 people. Rankings were confined to each Tergotometer run (contaning 4 compositions in 4 pots).

The average rankings for the 5 formulations are shown below (lower ranking = better softness):

Example No.	Average Tanking
1	2.97
2	2.15
3	1.53
4	2.20
control	3.65

The superior softening of the compositions over the control can clearly be seen.

Test 2

In this test compositions 5, 7 and 9 were compared with a control containing only di(hardened tallow) dimethyl ammoniumchloride, and a formulation 10 containing A and C but no B. The test was carried out in water of hardness 24° (French). The average ranking obtained among the five products was:

Example No.	Average Ranking
5	2.57
7	2.17
9	2.38
10	1.90
control	3.48

The superior softening of the compositions can again be seen.

Test 3

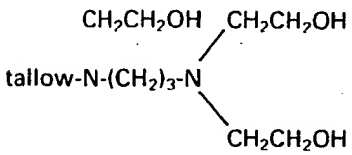
In this test compositions 6 and 8 were compared with the control under the same conditions as tests 1 and 2. The average softness rankings obtained were:

Example No.	Average Ranking
6	1.69
8	1.58
control	2.73

Again the superior softening is demonstrated.

Examples 15-18

A further five formulations were made in the manner described previously, but containing the following compound (D)



in place of the C_{18}-trimethyl ammoniumchloride (B). The formulations of these Examples were:

Sample No.	15	16	17	18
A (wt%)	4.96	4.02	4.06	3.59
D (wt%)	0.29	0.37	1.13	1.34
C (wt%)	0.74	1.61	0.81	1.08
Total wt% of active	6.00	6.00	6.00	6.00
A (mole%)	70	50	50	66⅔
D (mole%)	10	10	30	16⅔
C)mole%)	20	40	20	16⅔

Formulations 15-18 were compared in a softening test with a control based solely on di(hardened tallow) dimethyl ammoniumchloride. The conditions were exactly as outlined in softness Test 2. The average softness rankings obtained for these five formulations were as shown below:

Exaple No.	Average Ranking
15	2.78
16	2.33
17	2.35
18	1.97
control	3.22

The superior softening of the mixed active formulations over the control is evident.

It can be seen that the products of the invention can tolerate NaCl up to 0.16% without any deleterious effect on stability. The same is not true of the soap containing products.

Examples 28-31

Four products 28-31 were made from the following raw materials. The compositions of these 4 Examples is shown in the table below. The weight percentages in this table are in each case the % by weight of the 100% active ingredient in the final composition.

	Product composition in % by weight			
Ingredients	28	29	30	31
A (79.4% active)	2.96	2.99	2.96	2.99
Do(coco)dimethyl ammonium-chloride (79.4% active)	0.60	0.30	-	-
C (100% active)	0.48	0.72	0.48	0.72
C_{16}-trimethylammonium-chloride (47.7% active)	-	-	0.6	0.3

These four products were made by the following method. The mixture of the 3 components was heated to and maintained at 60°C until wholly liquid. This premix was added to stirred deionised water at 60°C. The volume of water was such as to bring the total composition weight to 500 g. Stirring was continued for 10 minutes.

All samples were stable liquid products.

The softness performance of these 4 formulations was compared with that of a commercial rinse conditioner based solely on di(hardened tallow) dimethyl ammoniumchloride. (The method of testing is that described on page 8 of the specification except that the aqueous dispersions contained 0.015% of active ingredients).

The average rankings for the 5 formulations were as shown below:

Product	Average ranking
28	2.43
29	1.73
30	2.73
31	2.03
control	3.57

The superior softening of all the mixed active formulations is clearly seen.

alkyl- or alkenyl groups.

4. A composition according to any one of claims 1-3, wh r in the alkylmonocarboxylic acids are the hardened tallow C_{16}-C_{18} saturated fatty acids.

5. A composition according to any one of claims 1-4, further comprising from 0-50 mole % of a relatively water-soluble cationic detergent surfactant.

6. A composition according to claim 5, comprising from 5-30 mole % of the relatively water-soluble cationic detergent surfactant.

7. A composition according to claim 5 or 6, wherein the relatively water-soluble cationic detergent surfactant contains one C_{10}-C_{24} alkyl group.

8. A composition according to any one of claims 1-4, further comprising a cationic polymer.

9. A composition according to claim 8, wherein the cationic polymer is a cationic guar gum, a quaternized dextran or a quaternized hydroxyethylcellulose.

10. A process for preparing aqueous compositions of claims 1-9, comprising premixing the cationic detergent surfactant and the alkyl- or alkenylmonocarboxylic acid, heating the resulting premix until it becomes clear, and adding the resulting, clear premix to water with stirring.

11. A composition according to any one of claims 1-9, substantially as hereinbefore described in any one of the specific Examples.

12. A process for preparing an aqueous composition according to claim 10, substantially as hereinbefore described in any one of the specific Examples.

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